

Energy and Shipping

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Floating Regasification The Aegean LNG terminal



ΔΗΜΟΣΙΑ
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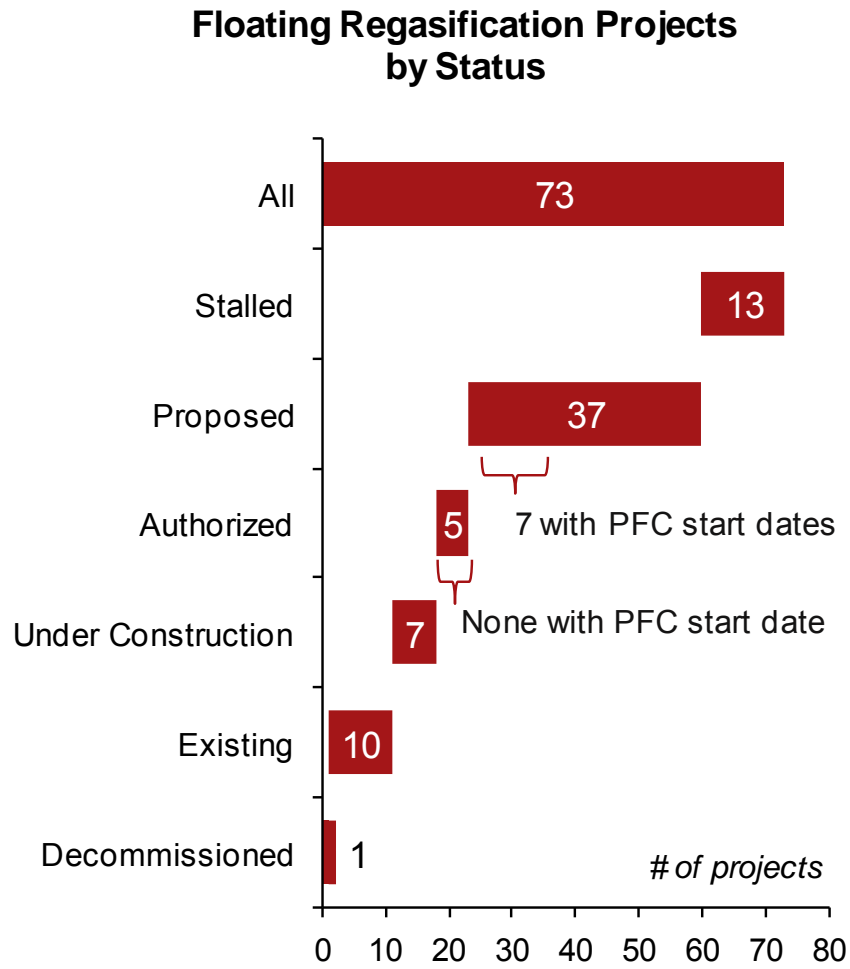




Contents

- **The growing role of FSRUs**
- The case of the Aegean LNG terminal / IGB System

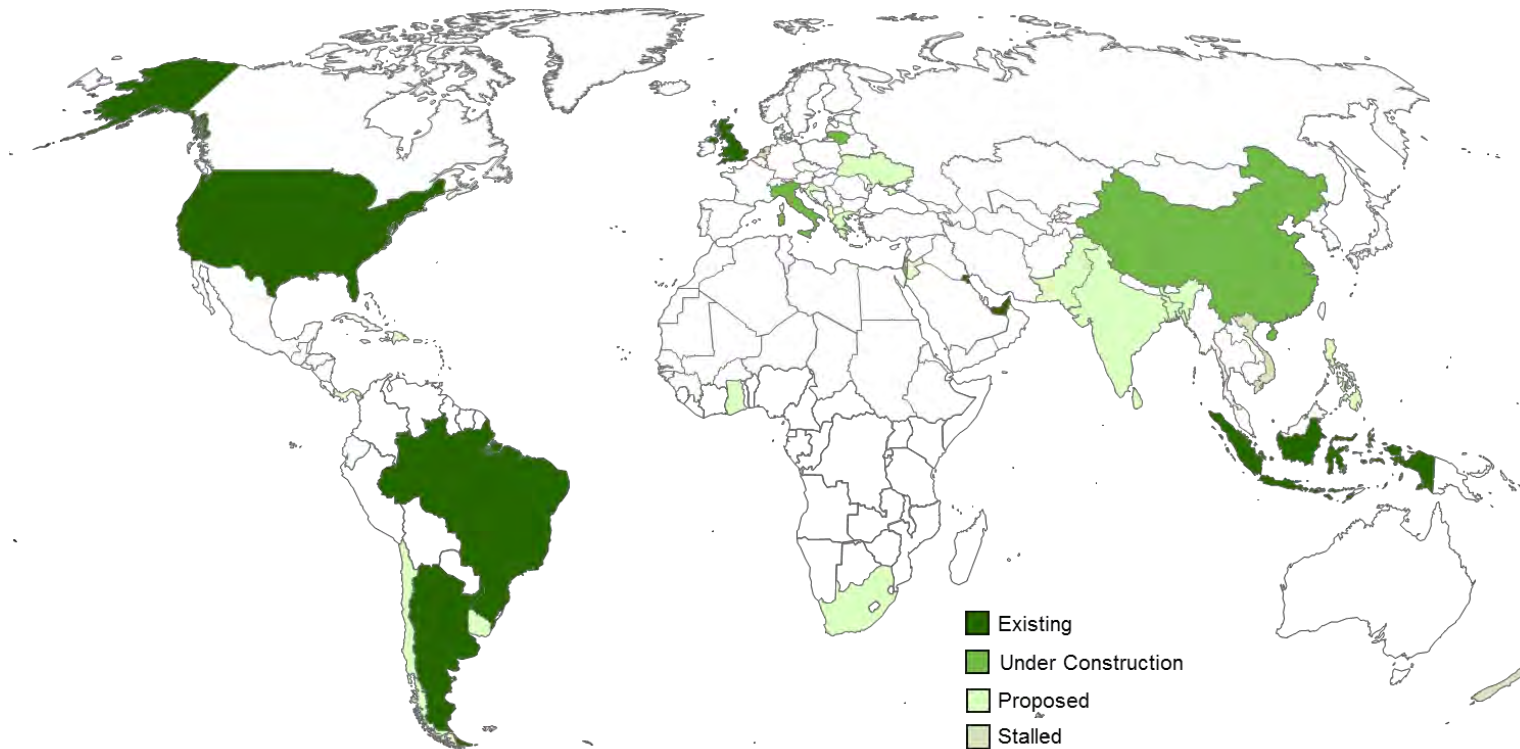
FSRUs: an increasingly interesting perspective



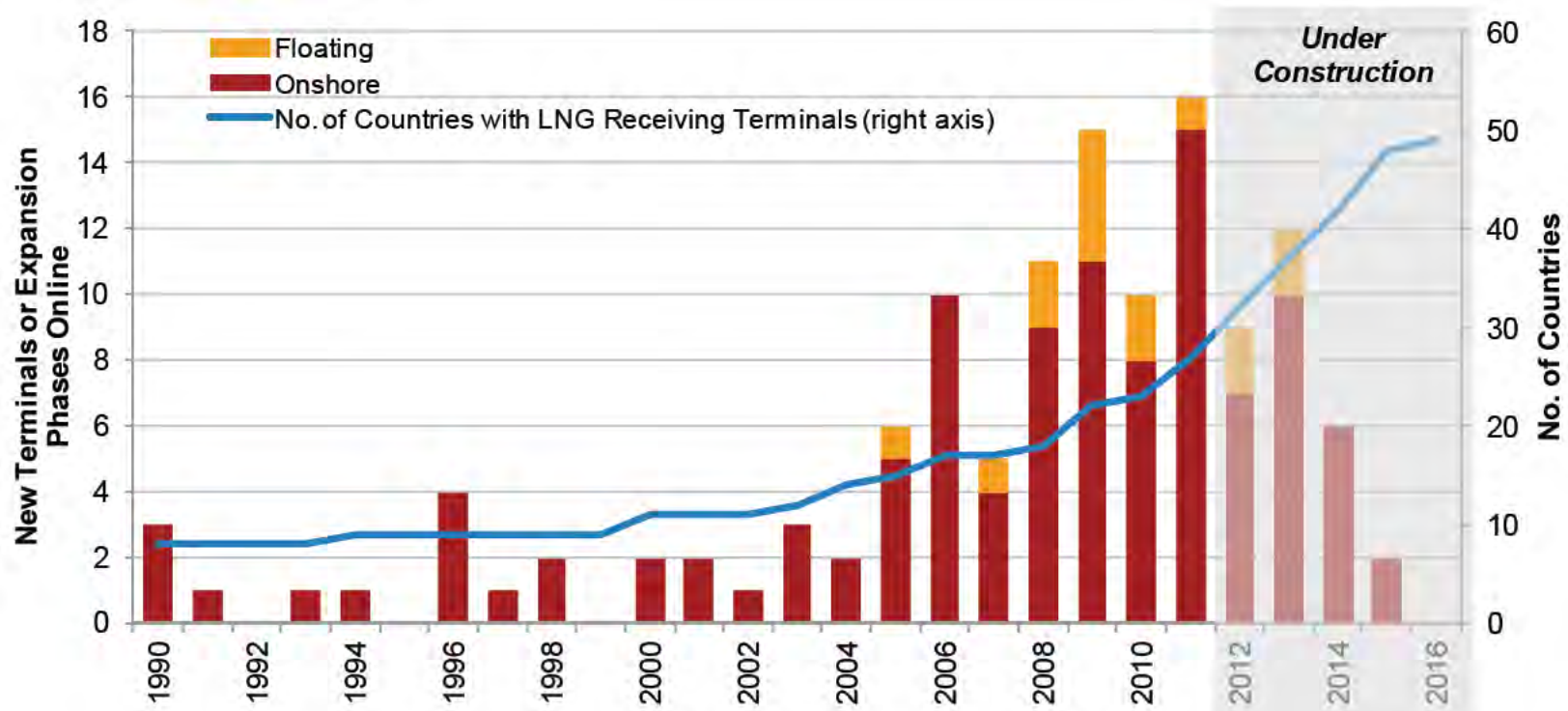
Source: PFC Energy



Geographic spread of floating regasification



FSRUs: an increasingly interesting perspective



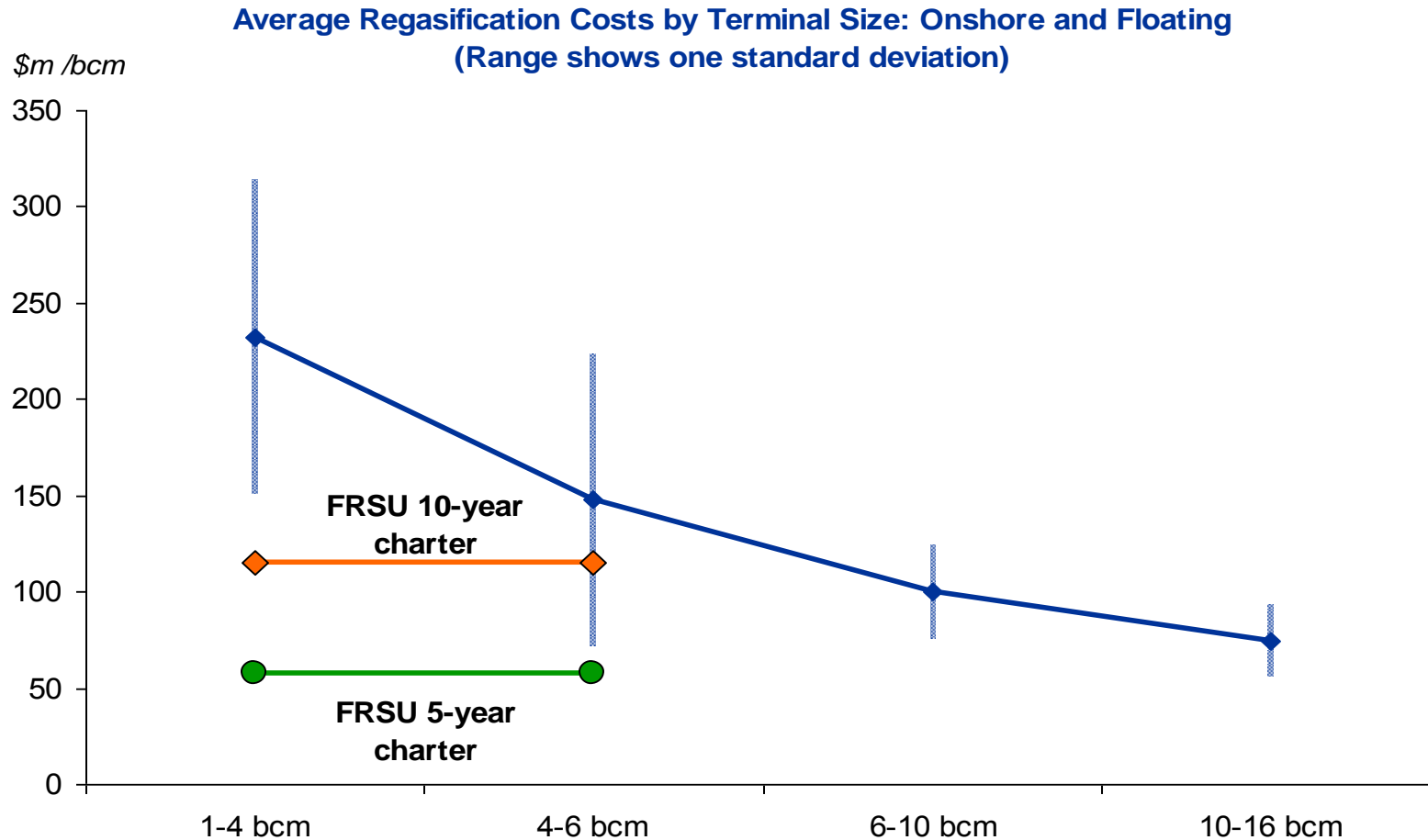


Floating vs Onshore LNG import Terminals

- Ideal to go offshore
 - Site specific restrictions and constraints
 - Permitting and security
 - Highly populated areas
- Cost efficient solution
- Rapid time-to-market access compared to onshore regasification plant
- Can be built in a well controlled shipyard environment
- Easy to mobilize and thus re-deployable



Floating terminals: a cost efficient solution

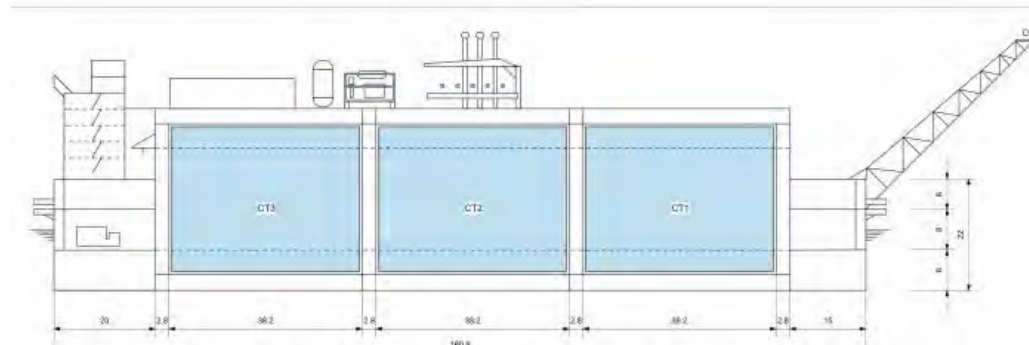


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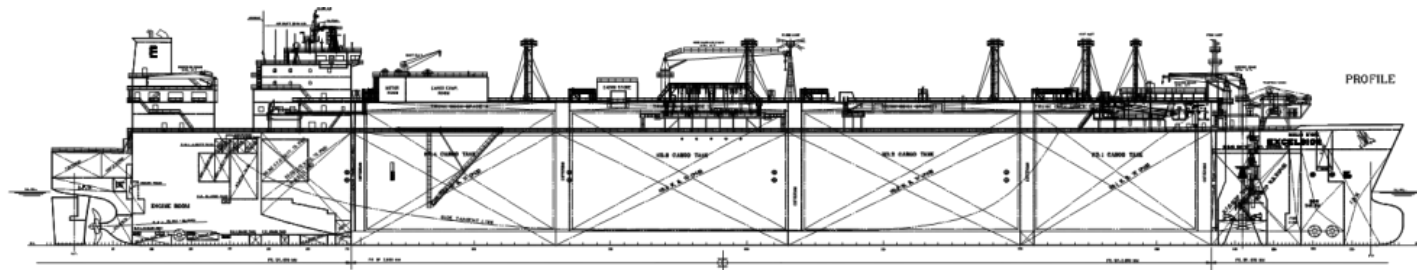


Two vessel design options

- FSRU (barge shaped type)



- LNGRV (ship type, which can also function as a traditional LNG carrier)





Option #1: FSRU

- Non-propelled barge
- Permanently moored to a shore jetty
- Significant simplifications/cost reductions
 - Straight barge-shaped hull – shorter hull length
 - Minimal engine room without propulsion plant
- Lower power requirements and fuel consumption
- Higher mobilization cost
- In-water diving inspection
 - in lieu of dry-docking every 5 years
 - in accordance with Classification requirements





Option #2: LNGRV

- LNG Regasification Vessel
 - Proven Design
 - LNG Carrier (LNGC) + regasification plant
 - Ship-Shaped & propulsion installed
- Easily re-deployed
- Optionality of using the LNGRV as conventional LNG Carrier
- Higher power requirements and fuel consumption (steam turbine)
- Lower mobilization cost

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- The growing role of FSRUs
 - **The case of the Aegean LNG terminal / IGB System**

The Aegean LNG / IGB System



The Aegean LNG project will be located in Northern Greece

In conjunction with IGB provides opportunity to reach the growing SE European energy market offering possibilities for diversification of natural gas sources and further penetration of LNG in the area.

EU Market

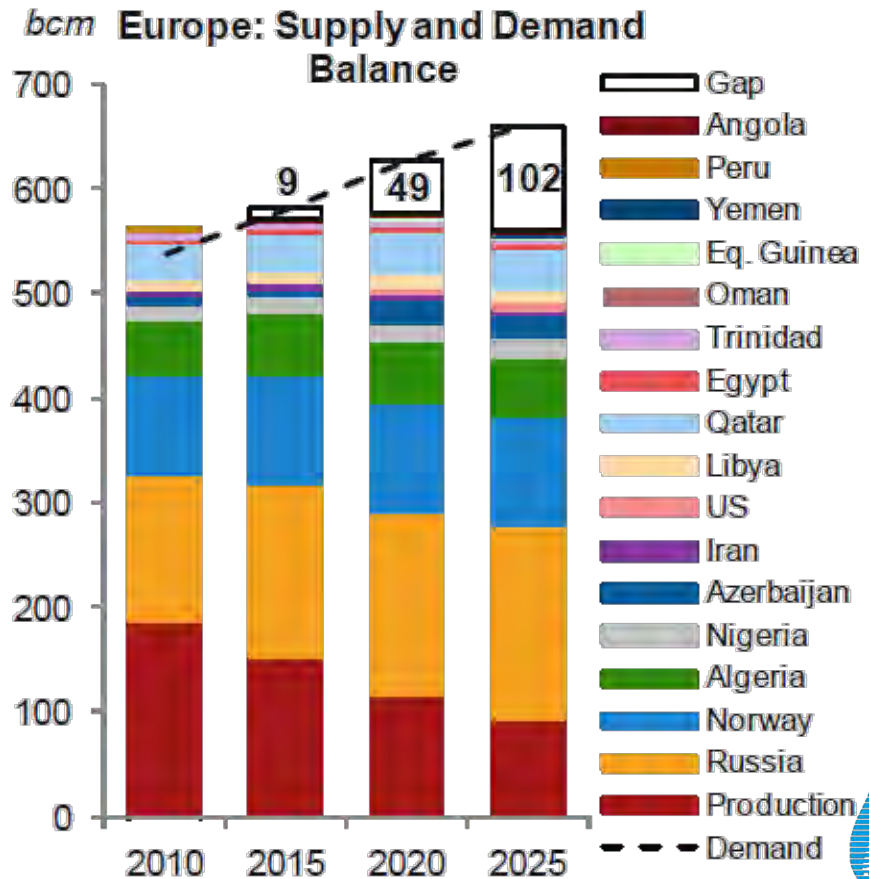
EU-30 Growing Supply Demand Imbalance

Europe needs to replace ~100 bcma from declining production by 2025.

Increasing demand
(just in Greece and despite the crisis, demand rose from 3.6bcm in 2010 to 4.2bcm in 2012).

Most of its existing suppliers will not increase exports.

Europe faces a supply-demand gap by 2020 and it grows larger by 2025.



Regional Market : South Eastern Europe (SEE) & Turkey – Developments in the region

Gas demand will grow by 2,5% p.a. through 2025 in SE Europe & Turkey (growth of 37,5bcma, from 62,5 bcma in 2010 to 100 bcma in 2025).

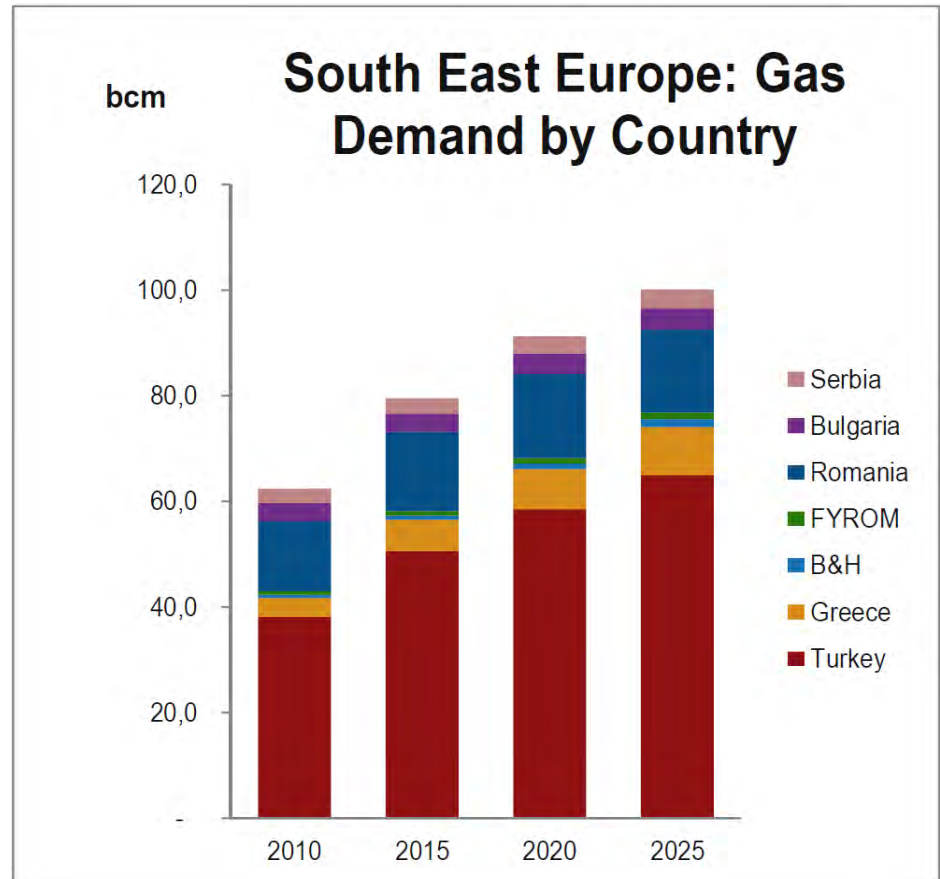
Greece, Bulgaria, Romania and Turkey remain the biggest markets in the region in 2025.

There are new potentially significant discoveries offshore Romania and Bulgaria.

Romanian domestic gas production is expected to decline by 2-3 bcma by 2025.

Considering the few options for meeting this supply gap, around 26 bcma are left to be met by different sources.

SEE & Turkey are in URGENT need of new suppliers to enhance its energy security.



Opportunity for the Aegean LNG suppliers to capture the SEE market

SEE market is:

- the closest market to new sources, including LNG through Greece;
- a growing market with competitive prices;
- in urgent need to diversify its supply sources and increase its energy security.

The Aegean LNG can be the first new infrastructure in the race to supply SEE by 2015-16



The Aegean LNG / IGB system provides a solution for SEE countries and Turkey to diversify gas sources & routes

A planned Floating Storage and Regasification Unit (FSRU) in Northern Greece will allow LNG to flow from 2015.

The Greece Bulgaria Interconnector (IGB) will supply up 3-5bcm/a by 2015-16.

Onward interconnectors to:

- Turkey (already in place)
- Hungary (already in place),
- Romania (May 2013),
- Serbia (2015),
- FYROM (planned)
- Albania (planned)





Aegean LNG – Technical Feasibility Established

DEPA has concluded a feasibility study of the Aegean LNG receiving terminal, based on which:

- Location feasibility established
- Floating facility, barge type FSRU or LNGRV
- Regasification capacity to support equivalent of 3-5 bcma
- Storage capacity 150,000 m³
- EIA study expected by mid 2013
- Estimated cost € 250-270 m
- Project execution: 30 months from FID



The Greece-Bulgaria Interconnector (IGB)

IGB acts as a gateway to SEE through Greece, creating synergies with smaller interconnectors in the region (eg. BG-RO), allowing access to the evolving SEE energy market .

- Capacity 3-5 bcma
- Construction to start within 2013
- The duration of construction / commissioning scheduled to last for 18 months.

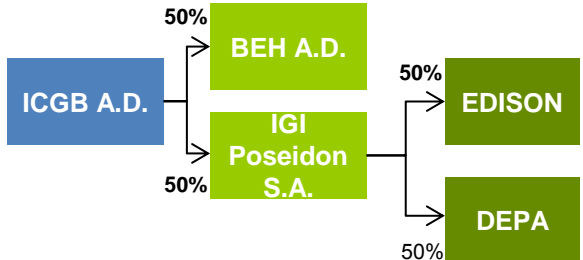
IGB has a wider regional importance (ranked first among EU Projects of Common Interest (PCI))

First gas is expected to flow in 2015.





Aegean LNG / IGB Summary Characteristics

	CAPEX	Capacity	Completion	Shareholders
Aegean LNG	270 m€ Potential for EU Funding	3-5 bcma	2015-16	DEPA Other possible investors
IGB	230 m€ Granted EU Funding: 45 m€	3-5 bcma	2015	 <pre>graph LR; ICGB[ICGB A.D.] -- 50% --> BEH[BEH A.D.]; ICGB -- 50% --> IGI[IGI Poseidon S.A.]; IGI -- 50% --> EDISON[EDISON]; IGI -- 50% --> DEPA[DEPA];</pre>





Why the Aegean LNG / IGB System

- Greece, the rest of Southern Europe and Turkey **need long-term supply** and are stable growing markets.
- The Aegean LNG is the **closest and least expensive route** to the Greek, SEE and Turkish markets.
- Aegean LNG can be the first regasification terminal to **target the broader SE European market** through IGB.
- **Multiple countries can be served through one EU entry point.**
- Aegean LNG is **at the crossroads of several key infrastructure projects**, including cross-border pipelines and gas storage.





Thank you for
your attention

